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## **RESEARCHING ART HISTORY USING THE TTC-ATENEA SYSTEM: AN INTERACTIVITY-BASED APPROACH**

### **Introduction**

The purpose of this essay is to show the research opportunities that the TTC-ATENEA system offers to scholars interested in art-theory, paying special attention to its potentiality to work as an interactive tool and networked environment. Throughout the exposition, I will address different notions of interactivity, interaction and network in order to contextualize the thread of this article. This has been arranged in two sections. Firstly, I will outline a brief description of the TTC-ATENEA system by explaining how it currently works. Secondly, I will introduce the implementations that we are integrating in the new version of the system, since the objective of these updates is indeed to increase the interactive possibilities of the TTC-ATENEA. In general terms, it can be said that we are migrating from an informational system – devoted to storing and retrieving information – into an intellectual, collaborative and productive environment according to the 2.0 philosophy and the so-called open and shared knowledge culture.<sup>1</sup>

### **1. The TTC-ATENEA system. General Overview**

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The TTC-ATENEA system is one of the outcomes resulting from the interdisciplinary project »Desarrollo de un tesoro terminológico conceptual (TTC) de los discursos teórico-artísticos españoles de la Edad Moderna y del corpus textual informatizado ATENEA (HAR2009-07068)«. This project, funded by the Spanish Ministry of Science and Innovation (MICINN), is being developed under my supervision at the University of Málaga. Together with this University, other relevant institutions are involved, like the University of Santiago de Compostela (Spain), the University of Valencia (Spain), the European University of Madrid (Spain), the Getty Research Institute (Los Angeles, USA) and the Centro de Documentación de Bienes Patrimoniales of Chile (Documentation Centre of Assets, Chile). It also maintains a fruitful collaboration with the University of Chicago (USA) and Signum (Centre for Computing-Based Humanities Research) at the Scuola Normale Superiore di Pisa.

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In order to understand how this system is organized and how it works, it is essential to remark its conceptual foundations. The system has been specifically conceived to facilitate one of the most significant difficulties which specialists in art theory encounter when they face up to art theoretical texts: the interpretative tasks. In relation with this problem, our epistemological starting point has been the idea, that these interpretative difficulties are determined by terminological problems basically; and that these terminological problems are due to the high degree of semantic density – polysemy, conceptual reinterpretations, slight variations in meaning, etc. – that characterized the art-theoretical vocabulary, and result in ambiguity, vagueness, and inaccuracy.<sup>2</sup>

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Consequently, the configuration of the ATENEA-TTC system is guided by the purpose of providing a satisfactory answer to this terminological/conceptual ambiguity, and this answer is based on one idea of interaction. That is: the diverse types of information extant in the system are connected among them and interact in different ways in order to produce significant results for the disambiguation processes, building, at the same time, a network of information.

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I will revert to this matter later in order to illustrate the idea with some examples. First, let us see how the ATENEA-TTC system is configured.

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Widely, this can be defined as a digital environment of networked information made up of two main components: ATENEA, which constitutes an electronic archive of significant art-historical Spanish texts, most of them encoded in XML-TEI; and the terminological and conceptual thesaurus (TTC), which compiles and describes the terms and concepts that appear in the ATENEA corpus. In other words, ATENEA is the source that provides terms and concepts to the TTC; and the TTC is the tool that determines the meanings of the terms and gives interpretations for the ideas and concepts formulated in the ATENEA texts (see. fig. 1).

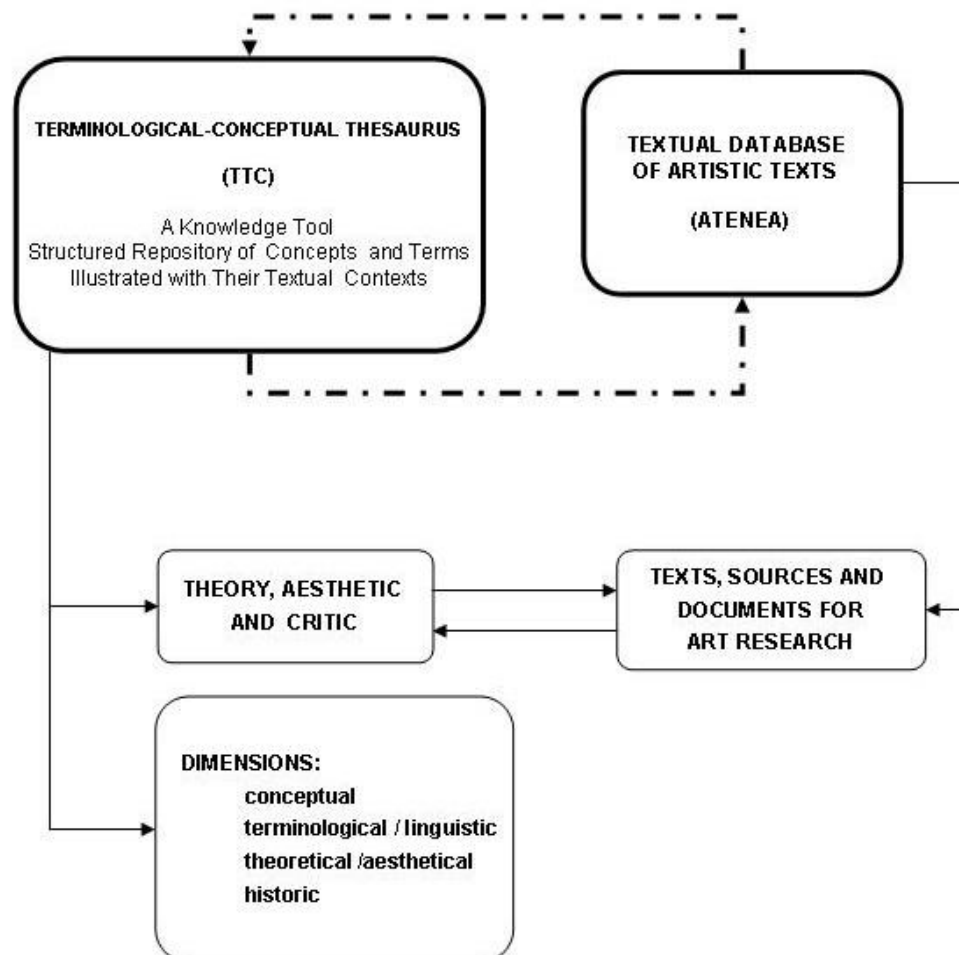


Fig. 1. TTC-ATENEA system. General overview.

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ATENEA is being developed according to an ontology-based conceptual structure. It has thus been conceived as a set of entities and specified relationships among them, as the figure 2 shows.<sup>3</sup>

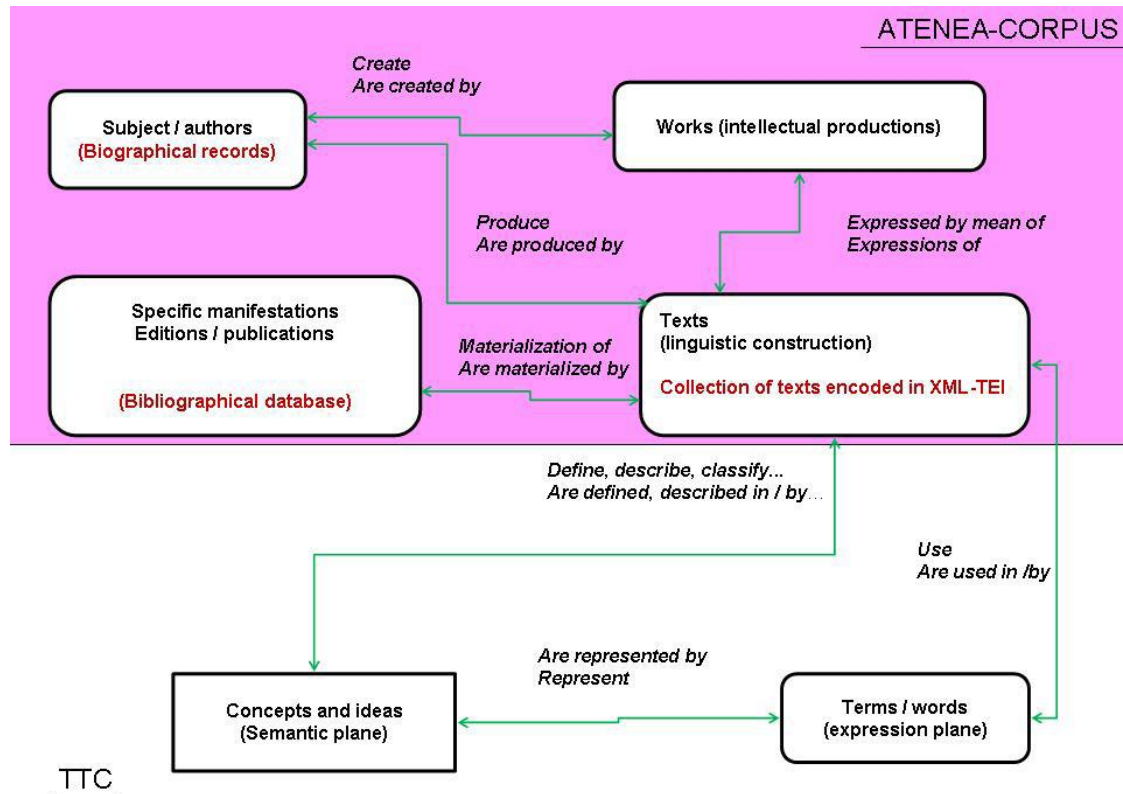


Fig. 2. The TTC-ATENEA system. Conceptual structure.

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The entity »subject« refers to the authors, whose information is recorded on a biographical database; »works« refers to the intellectual productions – in an abstract sense –, which can be expressed by different means – texts, images, sounds, etc. –. In the context of our specific project, the predominant mean is the text, understood as a linguistic construction. Furthermore, each text can be the object of different manifestations; for instance, the several editions/publications of a text throughout the time. The information concerning the texts is recorded in a specific repository, which computationally connects each text with their corresponding and diverse manifestations (editions/publications). In this regard, it is interesting to notice that the system offers a bibliographical record for every known edition of a text so that scholars can reconstruct the publishing history of each one (see fig. 3).

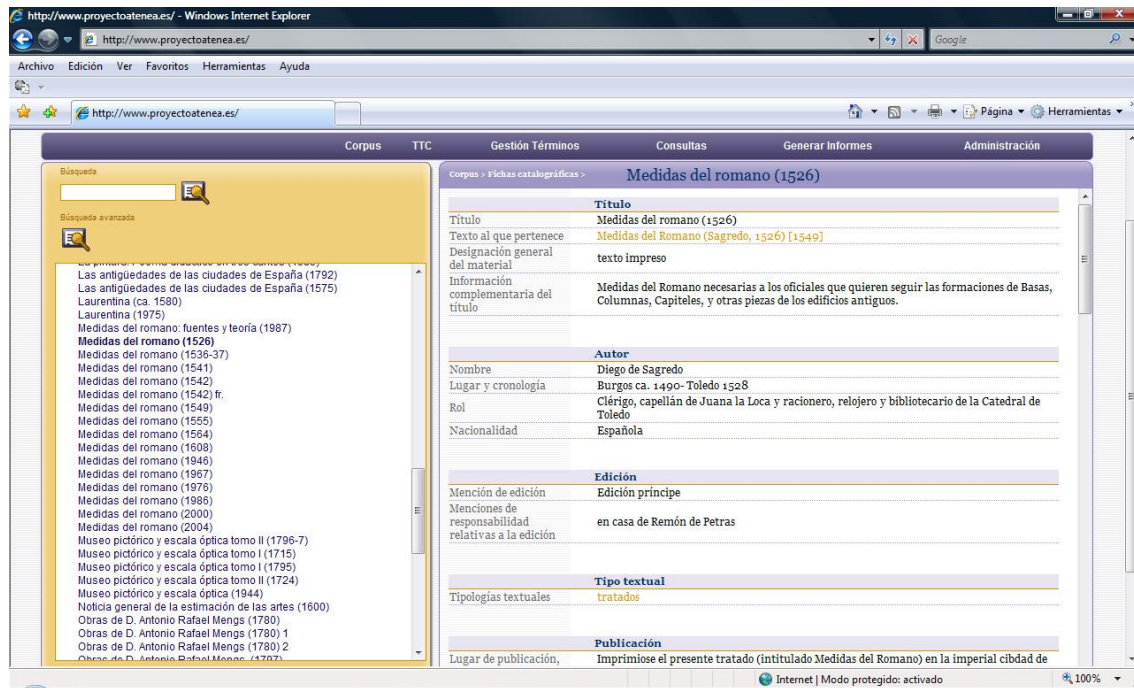


Fig. 3: See at the left of the screen the records for each existing edition of *Medidas del Romano* by Diego de Sagredo (1526).

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All these types of information are what constitute the ATENEA corpus. This textual repository, considered individually, works as a conventional digital archive. Therefore, users are able to retrieve full texts and read these on the screen; look through the metadata; make different types of queries using the classification systems that organize the collection of texts; retrieve bibliographical information, etc.

In addition to that, the system has been implemented with its own textual analyzer. Consequently, such computational linguistic functionalities enable users to explore the texts from a linguistic point of view, and this allows us to obtain words lists or concordance lines, among other queries (see fig. 4).

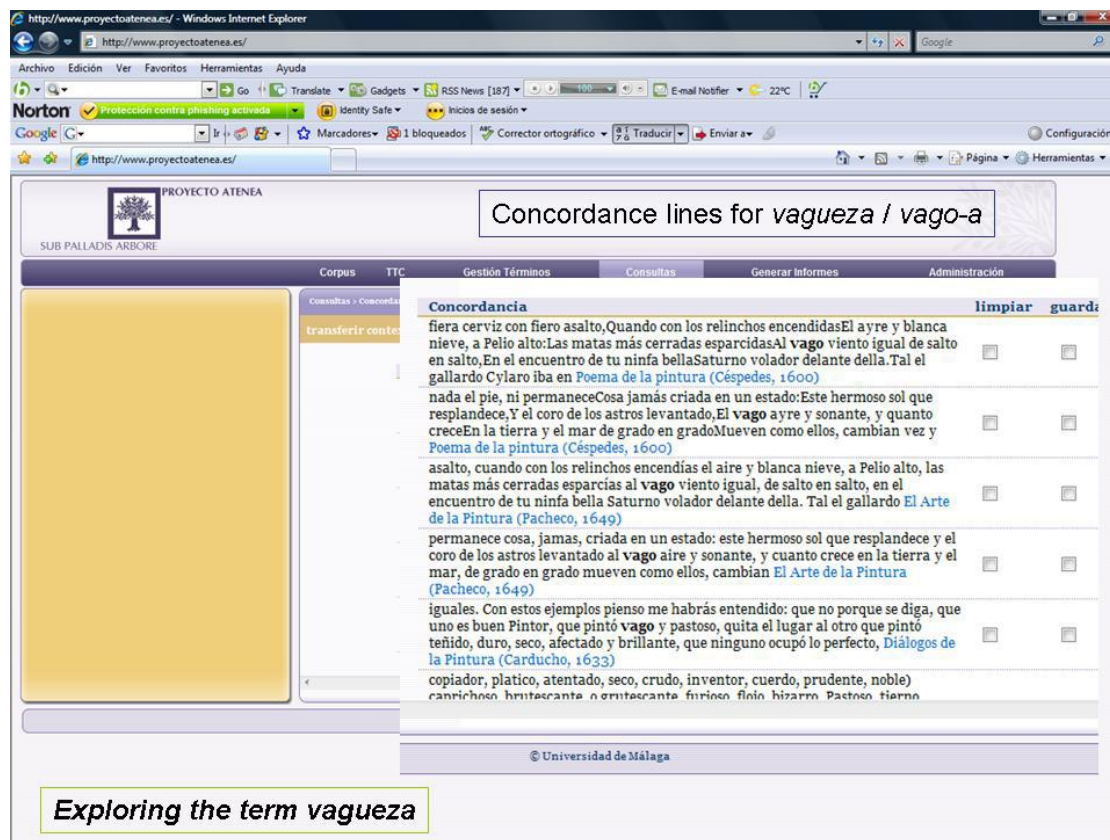


Fig. 4. Concordance lines obtained using the ATENEA's corpus analyzer.

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This feature represents an invaluable tool for the disambiguation processes, since it allows to compare the usage of certain words in different texts and to examine whether they are being used to convey the same idea or, by the contrary, there are any differences – even if slight ones – in their meanings.

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Complementary to this, part of the texts' content has been annotated according to a set of topic or subject previously codified in the system. That is why ATENEA, by searching through the entire corpus, is able to retrieve the specific textual locations where these topics and subjects are addressed and discussed (see fig. 5). As it is easy to understand, this feature is also very useful for scholars, since it would take a few seconds for someone interested in a specific artistic matter – for instance, the liberality

of the arts – to obtain what could only be achieved by reading through millions of pages.

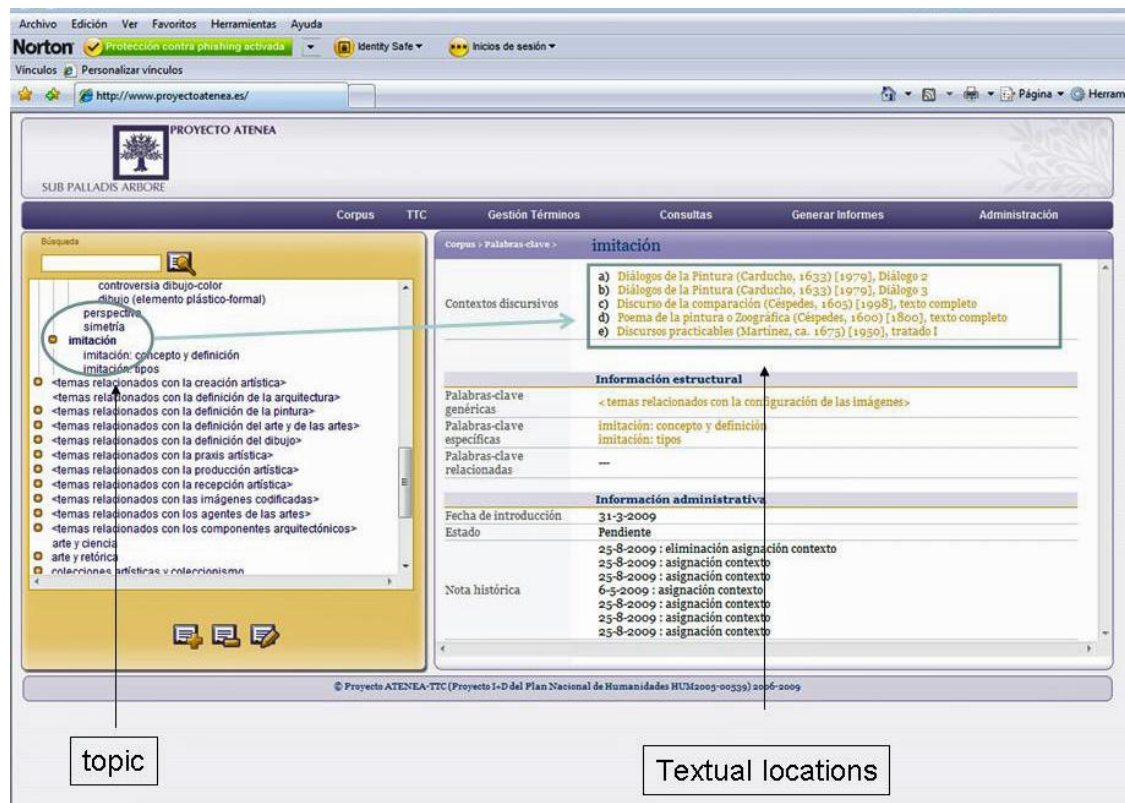


Fig. 5. Retrieving textual locations where specific topics are addressed.

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Finally, texts are the objects of analysis of the TTC – in their formal and semantic planes –, given that, as I have mentioned above, the TTC performs the function of describing the terms and concepts that appear in the ATENEA corpus (see fig. 2).

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Returning to the idea of interaction, we can say that the different types of information existing in the system are significantly connected or can be significantly connected as far as specialists use the potential connections provided by the computational architecture. For instance, the TTC, as a thesaurus itself, builds up its own network. Thus, terms and concepts are not only described or defined in the TTC but also classified into a conceptual structure and interrelated among them according to a net of



horizontal relationships. This can be seen in the following example taken from the record of the concept »vagueza«.

The screenshot displays the ATENEA project interface. On the left, a 'Búsqueda' (Search) panel shows a 'Búsqueda avanzada' (Advanced search) section with a 'Selecciona el orden' (Select the order) dropdown set to 'lógica' (logic). Below this is a 'HIERARCHICAL CLASSIFICATION' tree. The tree is organized into several levels: 'Dimensión metateórica', 'Dimensión teórico-crítica', 'ordenación temporal: periodos histórico-artísticos', 'conceptos teóricos', 'estilos y maneras', 'conceptos estético-críticos', 'conceptos estético-críticos: figuración', 'conceptos estético-críticos: dibujo y forma', 'conceptos estético-críticos: generales', 'conceptos estético-críticos: color', 'GENTILEZA (1) (Car) (Pac)', 'MORBIDEZA (1) (Car) (Pac) (Mar)', 'SECO (Men)', 'SUAVIDAD (Pac)', 'VAGUEZA (1) (Car)', 'VIVEZA (Pac)', 'conceptos estético-críticos: disposición y composición', 'géneros artísticos', 'El arte como actividad y proceso', 'El arte como producto', 'tipologías objetuales', 'La recepción artística', 'conceptos relacionados con la crítica artística', and 'conceptos relacionados con la recepción artística'. An arrow points from the 'VAGUEZA (1) (Car)' entry in the tree to the main content area.

The main content area is titled 'VAGUEZA (1) (Car)' and contains several sections: 'Cronología' (1633), 'Descripción' (Qualidad estética relacionada con el tratamiento empastado del colorido, lo cual configura una imagen de transiciones suave y cromáticamente armónica. Funciona, pues, como categoría opuesta a lo crudo o seco.), 'Contextos discursivos' (a) Con estos ejemplos pienso me habrás entendido: que no porque se diga, que uno es buen Pintor, que pintó vago y pastoso, quita el lugar al otro que pintó teñido, duro, seco, afectado y brillante [21, o, p5 (Ref: 1)] b) Pastoso, tierno, morbido, fresco, vago, aballado, suave, ensolvado, unido, acabado, estufado, lamido, trabajado, peleado, seco, crudo, perfilado, duro, penado, cansado, bien colorido, mal colorido, desunido [21, o, p7 (Ref: 2)], 'Contextos conceptuales', 'Información estructural y relacional' (Tipología conceptual: CATEGORÍAS ESTÉTICAS, Categorías o subcategorías: <conceptos estético-críticos: color>, Conceptos genéricos: ---, Conceptos específicos: ---, Conceptos relacionados: Asociado a: MORBIDEZA (1) (Car) (Pac) (Mar)), 'Información terminológica' (VAGUEZA (1) (Car)), and 'Información administrativa' (Fecha de introducción: 13-11-2007, Estado: Pendiente, Editor: atenea\_ttc, Grupo: grupo1, 13-11-2007: cambio de nombre, 13-11-2007: cambio de cronología, 13-11-2007: texto asignado, 13-11-2007: cambio de descripción). An arrow points from the 'Asociado a: MORBIDEZA (1) (Car) (Pac) (Mar)' entry to the 'ASSOCIATED CONCEPTS' label.

Fig. 6. Network of the concept *vagueza*.

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Nevertheless, the most significant of these interactions is the full interactivity that the system provides between the ATENEA textual archive and the TTC. The system easily allows the definition of connections between a term or a concept located in a XML-TEI marked text and the record of the TTC, where such term or concept is described and classified. In the same way, users can move from a term or a concept registered in the TTC to the exact points where they are located in the XML-TEI marked texts.

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For a better understanding of why this interaction is important for our disambiguation purposes, I must remark an important issue, since this represents one of the peculiarities of the TTC with respect to the conventional thesauri. That is: the TTC does not provide general definitions of descriptions for the terms and concepts that it compiles. In contrast, terms and concepts are defined according to how they have



been used by each author. This is the reason why we can say that the TTC is a critical artefact. It is not a mere accompaniment, like a complementary glossary. It contributes some critical information that has been filtered, processed and re-elaborated by the research team. I consider that this point deserves to be emphasized. Effectively, there are other projects that also link terms to online dictionary entries, in which users can find general definitions for the terms. However, in the TTC terms and concepts are defined in reference to the specific texts where they have been located. In this way, scholars are able to identify the precise senses that the terms assume in a specific textual context and, therefore, analyze with more accuracy their theory about the painting or about arts in general.

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This feature finds its explanation in the fact that the objective of this project is not only to distinguish the polysemy, that is, the different concepts that a term denotes (i.e., *disegno* as a product, *disegno* as an abstract concept, *disegno* as a stage of the pictorial activity, *disegno* as a formal component of the paintings,...) (see fig. 7).

### **Polysemy of the term *dibujo* (17<sup>th</sup> century)**

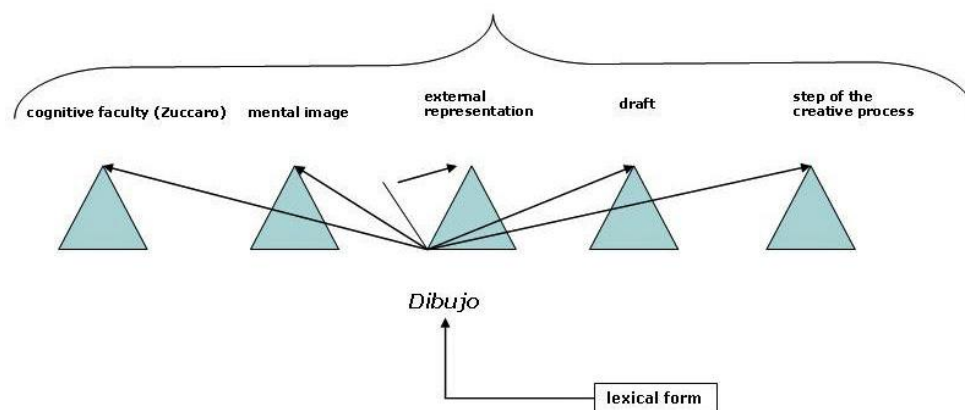


Fig. 7

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In fact, this is something that the conventional thesauri take into account. For example, in the Art & Architecture Thesaurus (AAT) of the Getty Research Institute, we can see how the term genius has two qualifiers in order to distinguish the two concepts that it represents (see fig. 8).

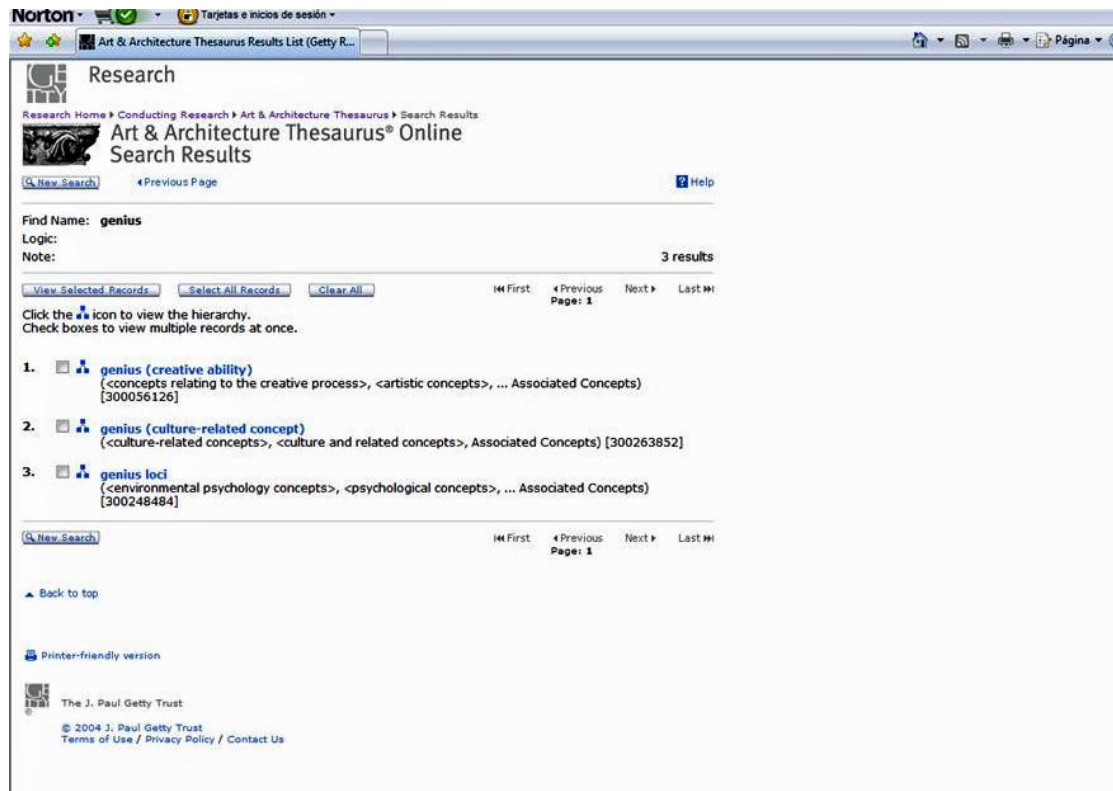


Fig. 8. Art & Architecture Thesaurus.

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But for specialists, interpretative problems arise when the same concept or idea (genius as creative ability) has different interpretations in the diverse treatises or texts where it is defined. In order to facilitate this interpretative task, in the ATENEA-TTC system terms and concepts are computationally assigned to the particular texts where they appear by means of some internal hyperlinks so that users can examine the specific meaning of them in each text. In addition to that, they are encoded according to a tagset of author-qualifiers specifically created for this purpose. Thus, the graphical display of the structure of the ATENEA-TTC allows users to see these differences easily.

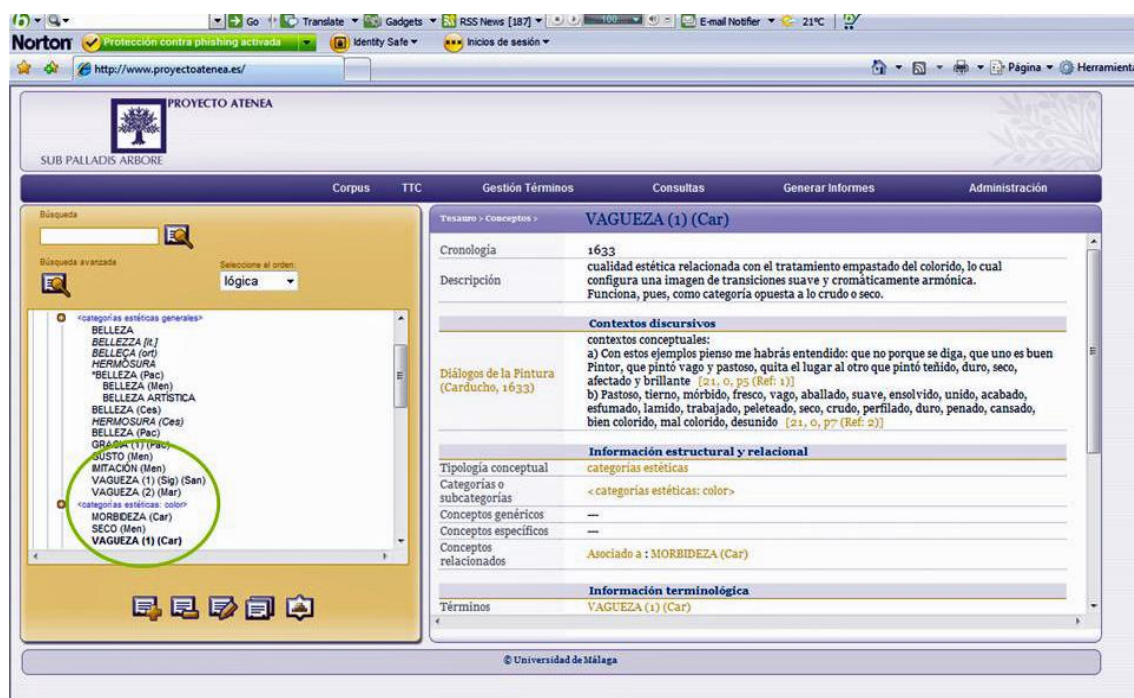


Fig. 9. Graphical display of the different reinterpretations of the concept *vagueza* encoded with author-qualifiers.

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Another relevant feature of the TTC that contributes to the clarification of the terminological ambiguity is the fact that the TTC not only records the different terms that represent an identical concept, that is, the synonymous variety, but it also shows such variety graphically in the conceptual structure, so that this visualization facilitates a more immediate apprehension of the lexical multiplicity that names a concept.

## 2. The TTC-ATENEA system as a work in progress. Current and future implementations

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The first implementation on which we are currently working has to do with images. Throughout years, texts, terms and concepts have been our research object; but now, we have strongly realized that we cannot omit the intrinsic relationship that exists between texts-words and visual artefacts – the artistic objects about which texts are talking – in the discipline of art history. As W. J. T Mitchell claimed in a text of 1994, art history is the result of the words used to describe, explain and interpret the artworks in view of the fact that the visual representations can only be represented by the

Discourse.<sup>4</sup> Thus, this relationship is one of the aspects that we aim to explore in the second stage of the development of ATENEA. How?

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Obviously, first of all we are implementing the system with a repository of images of visual arts related with the texts. Which kind of relationships are we considering? It is very simple up to now; types of relationships like these: works of art mentioned by an author in a text; works of art used as examples to explain some artistic concepts; works or art described in an ecphrastic way; prints and engravings included in the books, etc.

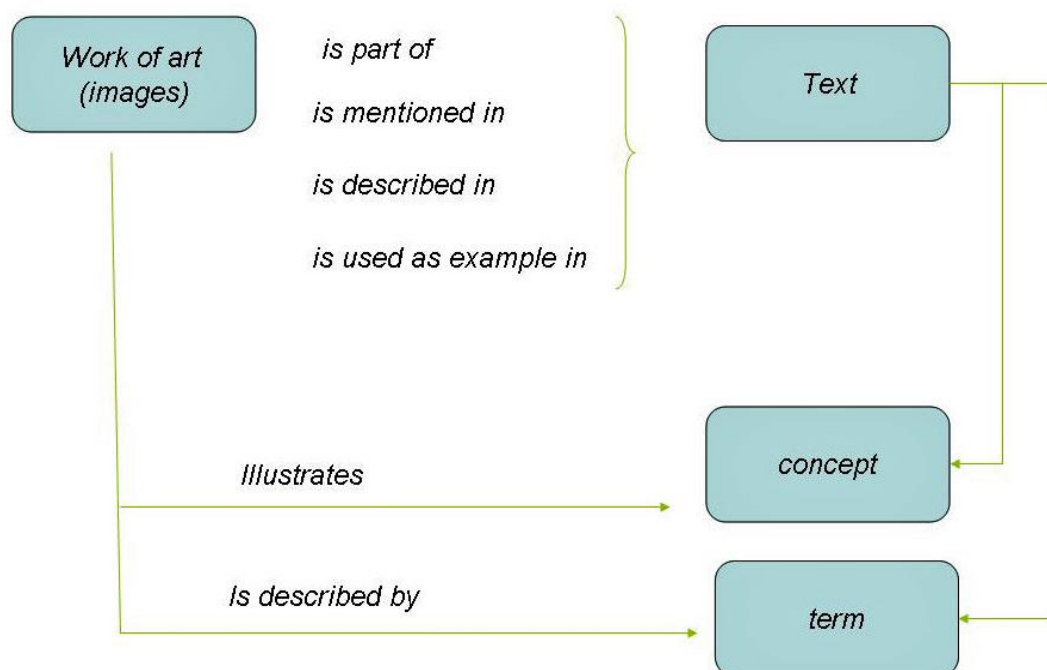


Fig.10. Types of relationships.

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From my point of view, the central theme of this research perspective must be to investigate how the relationships established – not only between images and text, but also among the images themselves – are able to produce some new significant knowledge or open some new understanding. Some interesting tools for analyzing images already exist; for example, with the high-resolution images we can explore details with great accuracy, something unthinkable a few years ago; we can cut the images into pieces and compare them; we can annotate part of the images by adding

some relevant information that enriches the comprehension of the image; but we need some tools for exploring and exploiting the relationships.

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Concerning this, what do we want to do? I must be honest; at this stage of the research our ideas are still a bit undefined, since it is part of the research itself. But I could give a suggestion: to explore ways of visual displays that make the relationships highly significant. For example, if we put together all the images shown in the figure above in a digital environment, with tools for managing them, and we relate them to the different ideas associated to the concept of organic in the twenties and thirties of the past century, maybe we could have a better idea about what organic meant, in its multiple dimensions, in that period of time, and how these different ideas interacted among them in the visual and intellectual culture that characterized those days.



Fig. 11. Images related to the concept of *organic*.

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The second implementation is related to the idea of the web as a global network of informational resources. Thus, one of the features in which we are interested consists of linking specific ATENEA units of information with resources already running on the web, which can enrich and expand the information provided by ATENEA, or even to open new lines of research. In other words, our objective is to connect the micro-network that ATENEA is itself with the big network that the whole web is.

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Let us consider some examples. A connection can be established between the TTC terms and general linguistic corpuses, as those managed by the Real Academia de la Lengua Española (<http://www.rae.es>). This connection could prove to be very useful in the comparison between the specialized usage of a particular term with its general usage.

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It is an important question if we take into consideration that most of the artistic vocabulary comes from the general vocabulary. Thus, when we are dealing with historical terms, to check which meanings had these out-of-use- terms in general context can become very significant given that this could help us to determine the meanings that they assumed in specialized contexts.

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Another connection can be established between the biographical information concerning authors with the Union List of Artistic Names (ULAN) records, the structured vocabulary developed by the Getty Research Institute (<http://www.getty.edu/research/tools/vocabularies/ulan/index.html>).

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It would also be interesting – and possible – to link the texts in ATENEA with their digital facsimiles stored in other digital libraries; with their related Italian textual sources, like those provided by the digital collections developed by Signum of the Scuola Normale Superiore di Pisa (<http://www.signum.sns.it>); with critical studies and scholarly researches related to them, etc.



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Ultimately, the aim is to create a global network of artistic knowledge significantly connected. Under this approach, ATENEA could work as a strong node of information that would bring together other nodes of artistic information on the web, all of which could interact dynamically according to the users' interests.

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The third idea of a network has to do with the collaborative and interactive work of the scholar communities. From its beginning, the ATENEA-TTC system was conceived as an environment for collaborative research; among other reasons, due to a practical need: the team is spread around the world so we need a virtual infrastructure for working online from multiple geographical points. That is why ATENEA is a web-served application that allows the management of groups of researchers, and also allows that the all team is working together at the same time, uploading dates and critical contents. More notable than this is the fact that the research itself is produced online; on the one hand, because of the technological tools available – like the textual analyzer mentioned above –; on the other hand, due to the contents contributed by the researchers. One example: once the researchers have recorded the definitions of a same term used by several authors, it is possible to make a comparison online among them in order to see if they have the same meaning or not. If so, we create a unique record where we join the definitions or descriptions provided by the authors. In this way, the digital content is reused by other researches for producing new knowledge or knew information.

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Finally, we want to go a step forward and to implement the system with 2.0 tools of social participation. This issue is crucial for the future development of ATENEA, since this implies – as I have mentioned at first – to turn ATENEA from an informational web site into a dynamic environment for producing knowledge. Also, this will allow specialists around the world interested in these topics and subjects to participate without restraint in the development of ATENEA as an open network of studies about Spanish art-theory and treatises.

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In this sense, we are focusing on two aspects:

1. to incorporate the practice of social tagging to enhance the access to the information. Up to now, each unit of information in ATENEA is described according to

the criteria of the research team: key words, subject matters, etc. are assigned by the team. If, given a specific text like *Poema de la Pintura* by Pablo de Céspedes (ca. 1605), we enable users to annotate this according to their interests, some users could incorporate the tag »sculpture« – a minor subject in this text, but a subject after all –, so that other users interested in sculpture would be able to retrieve this Céspedes' text where the topic is under consideration. Otherwise, this text would go unnoticed for this theme.

2. to incorporate tools for adding comments about specific subjects with the intention of promoting online discussion and critical debates.

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If we see these features in deep, we realize that both social tagging and online comments allow us to integrate different points of view about a subject, image, idea, concept, etc. In this way, this type of environment will make it possible to confront the interpretation provided by the research team with every interpretation – or point of view – given by other experts and specialists. As all these interpretations will be present together in the digital environment, this will contribute to dissolving the idea of the individual point of view that usually characterizes the art-historical interpretations when they are in print publications.

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In fact, it is another research line proposed by this project: to study how specialists in the humanities interact in this kind of environment and how it is possible to develop new ways of critical edition in a collaborative way.

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To conclude, I would like to call attention on this last question, because this leads us to a more conceptual problem than the simple application of new technologies. The question about which I think we should reflect in the next years is: **How can the discipline of art history begin to move away from single authorial models resulting in print-only publications, towards more open, collaborative, multidimensional models of research and publication that »take place« online?**

### Author's profile:

Nuria Rodríguez Ortega is chair of the Department of Art History at the University of Málaga, Spain. She obtained her doctorate in art history from the University of Málaga, and has a diploma in digital humanities from the University of Castilla La Mancha. She lectures frequently at various Spanish universities on topics relating to digital humanities and cultural heritage management. Since 2006, she has led a research project, TTC-ATENEA, financed by the Ministry of Innovation and Science of the Spanish government. Her most recent publication is the book *Teoría y literatura artística en la sociedad digital. Construcción y aplicabilidad de colecciones textuales informatizadas* (Gijón, Trea, 2009).

Nuria also works with the Museo del Patrimonio Municipal de Málaga, where she coordinates the activities of the education department. With Murtha Baca of the Getty Research Institute, she is conducting the *Digital Mellini* research project, a joint initiative of the GRI and the University of Málaga whose objective is to explore new digital tools and methodologies for art-historical research en publications.

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- 1 UNESCO: *Hacia las sociedades del conocimiento*, Ediciones UNESCO, 2005.
  - 2 Nuria Rodríguez Ortega: The TTC-ATENEA system: research opportunities in the field of art theoretical terminology, en *Digital Humanities Annual Conference'08. Books of abstracts*. Oulu, University, pp. 176-179.
  - 3 Certainly, it is not a real ontology because it has not been formalized as ontologies must be. So, one of the next steps in the development of the project is to turn the conceptual structure into a full fledged OWL ontology in order to achieve a formal explicit representation of the artistic epistemology contained in the texts.
  - 4 W.J.T. Mitchell: *Picture Theory: Essays on Verbal and Visual Representation*, Chicago, Chicago University Press, 1994.